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Littoral Combat Ship (LCS)
Wargame/Phase 1 Report
Annex A
Game Design and FOS/Sustainment Options

United States Fleet Forces

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1. Overview of LCS Study Continuum

Fleet Forces Command has undertaken a seven month study of the Littoral Combat Ship. The study is a continuum of analysis punctuated by two war game events, one in January (Phase 1) and one in June (Phase 2), with a series of smaller standalone issue specific excursions occurring between the two major war games. Pending leadership approval, the smaller events will focus on Mission Module Exchanges, Anti-Terrorism/Force Protection (AT/FP) challenges, aviation detachment (AVDET) manning, and a senior leaders' distributed gaming event designed to explore LCS command & control (C2) relationships and fleet and combatant commanders' intent regarding operational and tactical employment of LCS. The excursions will be conducted in the February through May timeframe and will produce stand alone deliverables while informing the build of the continuum's culminating event, a classified war game scheduled for June 2012.

This report summarizes the results of Phase 1, culminated by the January 2012 LCS Wargame.

1.1. Phase 1 Objectives

The intent of the initial phase of the LCS Continuum is:

- Present leadership with newly discovered LCS logistics and sustainment issues
- Present candidate solutions to both these new and existing issues
- Inform and assist our stakeholders with their LCS publications and lines of discovery while providing a venue for networking, relationship building, and follow on collaboration
- Inform the build and execution of the follow on continuum events

1.2. Design of LCS Wargame 1

The Phase 1 LCS Wargame considered one overarching 2016-based scenario premised on a steady-state forward deployment of four LCS (two of each variant) using the LCS Wholeness CONOPS (Rev D Flag Draft of 17 Oct 2011) and a notional 3:2:1 seaframe/core crew rotation cycle. The wargame was executed over four days (23-26 January 2012) and consisted of six moves.

The steady-state scenario was disrupted by a sequence of 22 scenario problems (Mission Scenario Event List/MSELs) that were given to each team. The players worked through each discrete scenario problem and produced a team solution. The scenario was one sided, blue force only, and involved execution of peace time logistics and sustainment in the context of an operations schedule. These scenarios included use of three different Forward Operating Sites (FOS) which mimicked Guam, Singapore, and Japan from a geographic perspective. From a capability perspective the three sites were described as being robust, moderate, or austere. Forward operating sites, their use, their location, and their internal capabilities are a critical factor in accurately depicting and understanding logistic issues associated with the LCS. MSELs were used to stimulate and focus player team discussions. The MSELS were derived from analytical questions based on the wargame objectives.

This process is shown in Figure 1-1 below.

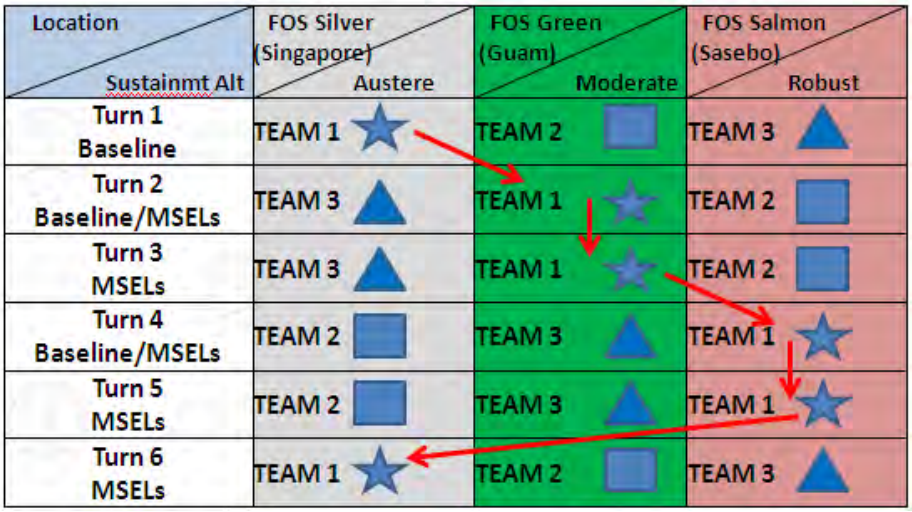

Figure 1-1: Wargame I turn-based construct

The three player teams included personnel that had skills addressed in the LCS CONOPS and included a mix of operational, sustainment and relevant resourcing organizations. Each player team consisted of 12 personnel. This provided multiple perspectives and "expert" looks at the problems. The overall wargame process flow is illustrated in Figure 1-2.

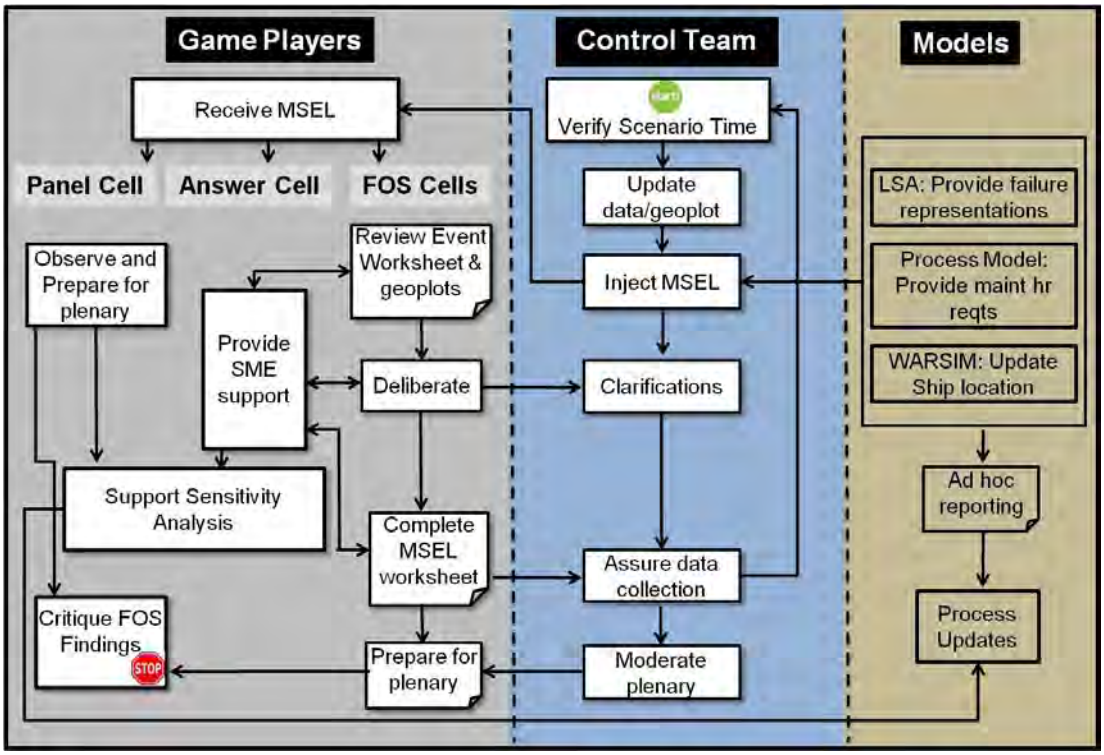

Figure 1-2: LCS Wargame Phase 1 Process Flow

A modeling and simulation (M&S) team provided players with insights derived from current LCS maintenance and sustainability models. The M&S team was composed of eight representatives from industry including Lockheed Martin, General Dynamics, and DEI.

An executive panel, a white cell, and an answer or response cell were used to control and facilitate game play. The executive panel was composed of seven personnel representing USFF N8, AIRPAC, COMPACFLT N8, PEO-LCS, LCSRON-1, OPNAV N86, and COMNAVSURFOR N8. The answer cell was composed of the Navy's 23 premier experts on the LCS from the government and industry and was used to answer player requests for information (RFIs) and assess team solutions and inform the Executive Panel. The analysis team was part of the white cell and collected data during execution.

1.3. MSELs

Table 1-1 specifies each of the MSEL injections during Wargame I. Each MSEL has a priority associated with it as well as a list of specific analytical objectives that the MSEL was designed to address (objective details Table 1-2). Each of the analytical objectives falls under one of the four overarching sub-objectives for the Wargame:

1. Capabilities and limitations of a Forward Operating Station (FOS) in basing/ operating LCS seaframe and associated mission packages
2. Assess maintenance provider (labor) support options of LCS seaframe and associated mission packages in forward deployed locations
3. Assess supply (parts)/ sustainment support options of LCS seaframe and associated mission packages in forward deployed locations
4. Asses the impacts on LCS seaframe and associated mission packages when situational deviations/ disruptions are imposed in the steady-state sustainment environment

MSEL #	Priority	Description	Analytical Objectives
1-01	H	FOS and sustainment options steady state	1.0, 2.0 3.0
2-01	M	Unplanned PMAV extension	1.1, 1.2 2.1
2-02	M	Unscheduled mission window extension	1.1, 1.2, 1.3 2.1, 2.2, 2.3
2-03	H	Critical personnel unplanned losses (include de-cert)	4.4, 4.5
2-04	L	Mission module resupply and retrograde	1.1 3.2, 3.4 4.9
2-05	M	Emergent maintenance Tech Assist away from FOS	1.1, 1.3 2.1 3.1
3-01	L	Weather impact on schedules (RAV/PMAV)	1.1, 1.2 2.1, 2.2, 2.3 3.3

3-02	H	Unplanned rotational crew/MP extension	1.1 2.1, 2.2, 2.3 4.6
3-03	H	EM/PMAV away from FOS (include AT/FP)	1.3 3.1,3.5 4.7
3-04	L	C2-MINIMIZE set, WESTCOM imposed reduction of available bandwidth	2.1 3.1 4.2
3-05	M	Cancelled at-sea RAS, requires non FOS BSF/BSP	1.3 4.7
4-01	H	FPCON shift at FOS	1.1 3.1 4.7
4-02	H	Underway Switchboard casualty	1.1 2.1, 2.4 3.1, 3.5 4.9
4-03	M	Mission package swap-out; w/o helo swap-out	1.1 2.1,2.2 3.4 4.1,4.5,4.9
4-04	M	Underway shipboard tech assist	2.3,2.4 3.3
5-01	H	LCSRON suffers earthquake; Loss of DS	2.1 3.1 4.2
5-02	H	Planned operational requirement for multi-LCS SAG	1.1,1.2 2.1,2.2,2.3 3.4 4.3,4.6,4.8
5-03	M	Shortened RAV period	1.1, 1.2 2.1,2.2,2.3
5-04	H	Helo damage, requires crew and helo replacement	1.1 2.3 4.4, 4.5
6-01	H	Distance Support interruption, loss of NIAPS	2.1,2.2,2.3 3.1,3.2,3.3 4.2
6-02	H	Mission Package swap-out; w/ helo swap-out (include ammo & de-cert)	1.1 2.1,2.2,2.3 3.4 4.1,4.5,4.9
6-03	H	Swap-out MP crews cannot obtain country clearance	4.1
6-04	H	Emergent operational requirement for multi-LCS SAG	3.4 4.3,4.6,4.8

Table 1-1: MSEL List

Analytical Objective	Description
1.1	Capability of a given FOS to sustain a given number/ type of LCS seaframes/ MPs at a given level of readiness.
1.2	Responsiveness of the FOS to accommodate surges in maintenance and repair requirements
1.3	Capabilities and limitations of an imposed Remote Operating Station in temporarily sustaining LCS seaframe and associated mission packages.
2.1	Assess maintenance (labor) support options for LCS Seaframe.
2.2	Assess maintenance (labor) support options for LCS Mission Modules (MM).
2.3	Assess maintenance (labor) support options for LCS Support Aircraft.
2.4	Assess Technical Assistance support options for the LCS seaframe and associated mission packages.
3.1	Assess supply (parts)/ sustainment support options for LCS Seaframe .
3.2	Assess supply (parts)/ sustainment support options for LCS Mission Modules (MM).
3.3	Assess supply (parts)/ sustainment support options for LCS Support Aircraft
3.4	Assess Ordnance Support.
3.5	Assess where supply (parts)/ sustainment will be located (stored).
4.1	Assess the impact to the LCS platform associated with an unscheduled Mission Package swap-out(s).
4.2	Assess the impact to the LCS platform associated with a Distance Support interruption.
4.3	Assess the impact to the LCS platform associated with an emergent operational requirement for multi-LCS SAG.
4.4	Assess the impact to the LCS platform associated with a manpower unplanned losses.
4.5	Assess the impact to the LCS platform associated with an expired Certification/De-certification
4.6	Assess the impact to the LCS platform associated with an unplanned deployed crew/MP extension.
4.7	Assess the impact to the LCS platform associated with an Anti-Terrorism/ Force Protection (AT/FP).
4.8	Assess at sea sustainment support options of LCS seaframe and associated mission packages in forward deployed locations.
4.9	Assess the impacts of the resupply and retrograde process on the LCS seaframe and associated mission packages in forward deployed locations.

Table 1-2: List of Analytical objectives

1.4. Wargame I Assumptions

Strategic, mission package, personnel, training, maintenance and logistics assumptions were made to aid player gameplay. These assumptions were a combination of the information contained in the current LCS doctrine and sailor LCS experience. With LCS in the early stages of development, assessment of the capabilities and limitations of the platform along with the adequacy of specific logistics and sustainment approaches relies on SME opinion vice concrete data. For this wargame there was an added level of complexity with attempting to paint an operational picture for the year 2016. As with all projections into the future there is the potential for many of the assumptions to be violated in one way or another. As such, the assessment of player actions should remain tied to the list of assumptions provided here. These assumptions were reasonable given the current state of the LCS program but they should continue to be monitored for validity with all violations assessed in terms of their potential impact

Item	Scenario Assumptions - Strategic
1	Classification: Wargame will be conducted at UNCLASSIFIED level
2	Geographic Region of Interest: C7F AOR
3	Timeframe: 2016+
4	Context: Peacetime (Phase 0) operations
5	Employment Concept: 4 LCS Operating from a Forward Operating Station (examine 3 FOS locations)
6	Focus: Examine Wholeness CONOPS in 'Steady State' Sustainment
7	LCS Platform Wholeness CONOPS (Rev D) is basis for sustainment gameplay
8	LCS Training Manual is basis for training gameplay
9	Fleet Commander's integrated training requirements form basis for integrated training
10	Four LCS seaframes on 16-month rotations (2 ships of each type) (16-month in-theater presence per seaframe rotation)
11	Four LCS seaframes in San Diego supporting homeport training and seaframe rotation
12	Each seaframe and associated MP is manned based on 3-2-1 rotational crew plan, with crew swaps every 4 months.
13	Options are not constrained to the immediate assets associated with 4 deployed and 4 home-based seaframes/MPs
14	Total of 12 MM exist; 4 ASW, 4 SUW, 4 MCM
15	Deployed MP mix: 2 SUW, 2 MCM
16	Homeported seaframes will have MMs installed
17	9 MH-60R and 6 MH-60S airframes are available to support appropriate MPs (3:3:1 rotation)
18	Non-Proprietary data for seaframes and MPs
19	Initial Wargame is not looking at seaframe or MP operational employment

Table 1-3: Strategic Assumptions

Item	Scenario Assumptions - Mission Packages
1	SUW: 19-man MM detachment; one MH60R + two MQ-8Bs; 23-man AVDET
2	ASW: 15-man MM detachment; one MH60R + two MQ-8Bs; 23-man AVDET
3	MCM: 15-man MM detachment; one MH60S + one MQ-8B; 23-man AVDET
4	Exchange of co-located MPs, including securing, testing of newly installed MP; 96 hours (does not include transportation or final crew/equipment preps for mission operations. (MP work-up and Aviation WOWU require 12-14 days following MP swap and/or crew rotation)
5	MPSF is lead agent for MP exchanges. Done IAW MM Holistic Embarkation/Debarkation Guide (HEDG), LCS MP Transportation Logistics CONOPS
6	MMs are sustainable in a 30-day deployed period for 21 operational days before replenishment of spares and/or systems is required
7	MM pre-expended bin for O-level maintenance and repairs within MM crew capability
8	AVDET manning does not support around the clock flight operations

Table 1-4: Mission Package Assumptions

Item	Scenario Assumptions - Personnel
1	Seaframe Core crew: 40 personnel
2	5-Day Crew Turnover every 117 days
3	Crew Certification: Core crews complete Unit Level Certifications in 14 mission areas every 12 months (Blue & Gold do it every 16 Months)
4	LCSRON Detachment at FOS: 10 personnel to support 2 ships. Add another 5-10 personnel for 3 or 4 ships (pg 50) Maintenance providers for continuous and planned maintenance will be in addition to these.

Table 1-5: Personnel Assumptions

Scenario Assumptions – Training
All T2Q/T2C infrastructure/capability is in place

Table 1-6: Training Assumptions

Item	Scenario Assumptions - Maintenance
1	LCS Regular CNO availabilities are conducted at 32-month periodicity on SDIEGO LCSs
2	14-Day RAV per seaframe every 4 months (coincident with oncoming crew)
3	5-Day PMAV per seaframe for every 25 days of operations
4	Core/MM crew is responsible for all PMS with periodicity of 'Monthly' or less, and Situational requirements
5	Maintenance Providers/MPSF/MMRC personnel are responsible for PMS quarterly and longer, O and I level maint
6	AVDET has full O-level maintenance capability for all airframes when embarked
7	PSP is in-place and will be conducted by contractor personnel with same strategies used in current ISP except for differences discussed in LCS PW CONOPS Rev D
8	Title 10 Restrictions will apply (non-voyage repair) - Cannot perform work in foreign ports - Cannot use foreign labor
9	MM spares (PUK) are replenished at 21-day intervals
10	MM pre-expended bin for O-level maint and repairs within MM crew capability
11	HAZMAT onboard to support 30-45 day mission usage
12	FOS Maintenance facilities: 10000-14000 SF laydown area, climate control, power requirements
13	FOS Shore Support for ships: Crane capacity of 130,000 LBs for MM swap, 60 Hz shore power
14	Maintenance Support Team (MST) provides: DS coordination, PSP contract management, Casualty Reporting, etc
15	Elements of MST may be permanently stationed OCONUS
16	Maintenance Providers/MPSF/MMRC personnel are responsible for PMS quarterly and longer, O and I level maintenance
17	Leverage existing COMLOGWESTPAC support when possible

Table 1-7: Personnel Assumptions

Item	Scenario Assumptions – Logistics
1	MM Maintenance/Storage facility at FOS
2	Regional husbanding contracts over the AOR. (contracts contain CLINs that cover LCS specific requirements)
3	Channel Flight available at all FOSs
4	LST personnel are NOT located forward at FOS. FLC Yokosuka Site personnel matrixed to LST for boots on ground support.
5	LST Fly-away teams are available on 48-hour call out
6	Bunker contract (fuel) available at FOS; Bunker contracts DO NOT cover all AOR ports
7	T-AO /T-AKE is not assumed to be readily available
8	Bandwidth is adequate
9	Shore HAZMAT storage available for ships to draw from
10	Pierside internet available at 2 FOSs. Available via satellite connection at 1 FOS; subject to other AOR restrictions
11	Shore medical support available via base facilities at 2 FOS, via commercial means through TRICARE Overseas Pgm. at I FOS
12	Seaboxes not onboard

Table 1-8: Logistics Assumptions

1.5. Scenario Visualization

Each of the Wargame teams were presented with hypothetical schedules to aid their decision making process for a given MSEL. An example of one such schedule can be seen in Figure 1-3. Participants were given the schedules for each of the 4 LCSs along with the mission package installed on the given platform. The time frame affected by the MSEL was highlighted for clarity. Players used the provided schedule to come up with course of action. The specific actions taken by each of the teams were accumulated and synthesized into the overarching findings from the game.

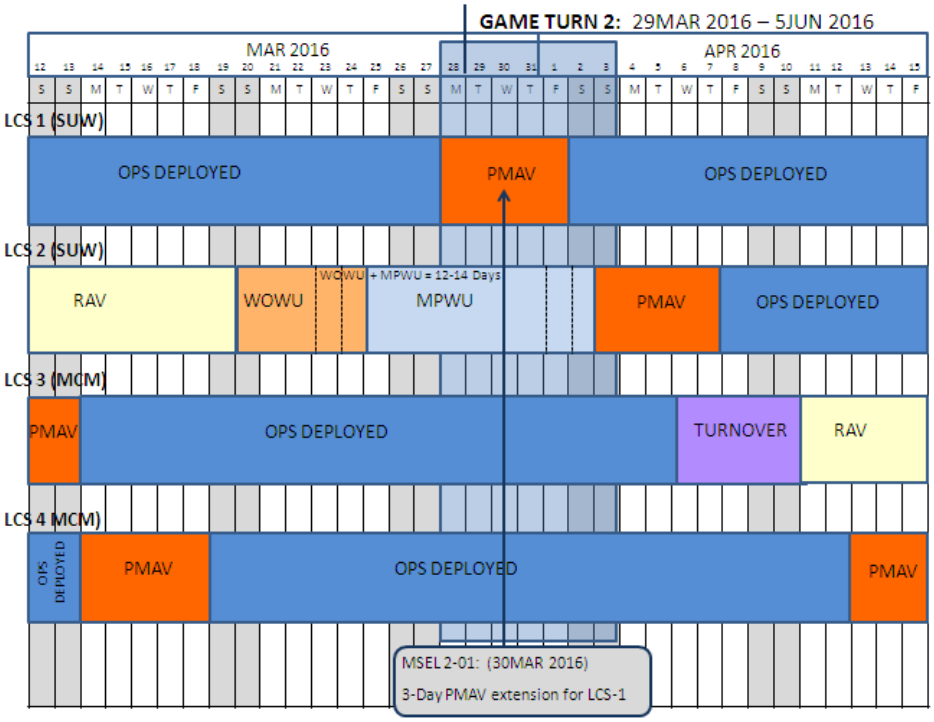

Figure 1-3: Example Schedule for MSEL 2-01

2. Forward Operating Sites and Sustainment Options

The Permanent Support Plan (PSP) for sustainment of LCS overseas has not yet been decided. In order to support the wargame, PMS-505 developed three notional "LCS sustainment options" for consideration. These sustainment options were developed by a Lockheed-Martin contractor working at PMS-505, and approved by PMS-505 for use in the wargame.

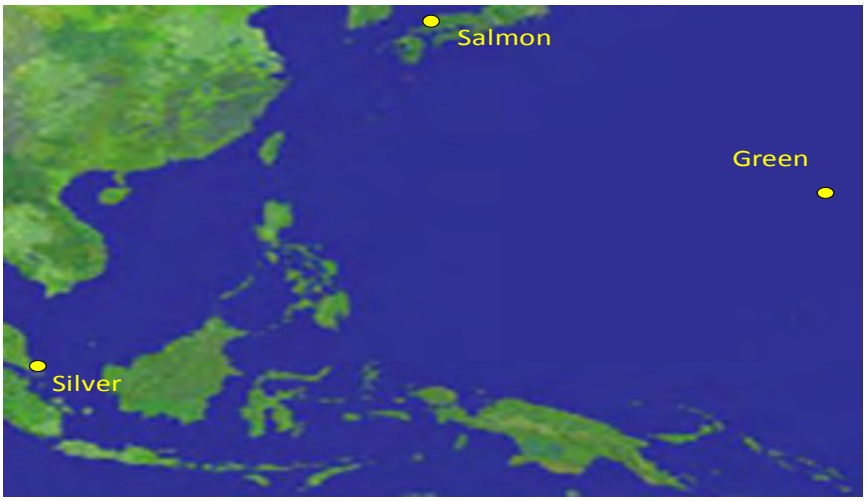

Figure 2-1: Notional FOS geographic locations

The wargame was tasked to consider three different geographic locations as forward operating sites and game design aligned each sustainment option to a particular notional FOS location that seemed to align with the scope of support we would anticipate at the geographic location. FOS Salmon was given the robust option, FOS Green the moderate option, and FOS Silver the austere option (Figure 2-1).

A summary of the notional maintenance characteristics of each sustainment option is provided in Tables 2-1 and 2-2.

Element	Robust	Moderate	Austere
FOS site	Large facility for maint team + spares inventory	Moderate facility for team and spares	Small facility for Core team
Maint Team Approach (seaframe)	• 2 full fwd teams(160FTE) for FM/CM/PM • Fly-away Required CM repairs	• 1 full fwd team (80FTE) for FM/CM/PM • Fly-away Agumentation and reqd CM repairs	• 1 small team (20FTE) for FM/CM/PM • Fly-away team for Majority of FM/PM/CM
Supply (seaframe)	• Existing COSAL • *CONUS Warehouse • OEM reachback • OCONUS warehouse	• Minor Enhanced COSAL • *CONUS warehouse • OEM reachback • Portable spares kits	• Enhanced COSAL • *CONUS Warehouse • OEM reachback
Mission Modules	•Mission Module Readiness Center (MMRC) • 2 full teams - 16 personnel (1 Govt + 15 CTR) •Co-located with FOS •Flyaway team for MP swap(ASW/MCM(8),SUW(16))	• Mission Module Staging Annex (MMSA) • 9 personnel (1 Govt + 8 CTR) •Co-located with FOS •Flyaway team for MP swap(ASW/MCM(8),SUW(16))	•Mission Module Staging Annex (MMSA) • 2 personnel (1 Govt + 1 CTR) •Co-located with FOS •Flyaway team for MP swap(ASW/MCM(8),SUW(16))
Aviation	AVDET with support from Flyaway team	AVDET with support from Flyaway team	AVDET with support from Flyaway team
LCSRON	Team of 17 at the FOS	Team of 17 at the FOS	Team of 17 at the FOS

*CONUS warehouse supports both forward and home ported ships

Table 2-1: Notional FOS maintenance options used in Wargame I

Element	Robust	Moderate	Austere
MM Site (co-located with FOS)	•Mission Module Readiness Center (MMRC) - Large facility with MHE and storage with O/I level maintenance capability • 20,147 ft^2 (storage, maintenance area, Admin, storage, MHE, etc.)	•MMSA – Equal facility caretaker and coordination staffing – Equal facility; caretaker and coordination staffing , no maintenance capability • 20,147 ft^2 (storage, maintenance area, Admin, storage, MHE, etc.)	MMSA – Equal facility caretaker and coordination staffing - no m maintenance capability •20,147 ft^2 (storage, maintenance area, Admin, storage, MHE, etc.)
Maint Team Approach	• 13 maint techs at MMRC perform local PM/CM and fly-away maint • Fly-away augment for RAV/ PMAVs and reqd CM repairs • Tools and test equipment	• 6 maint techs at MMSA perform local PM/CM and fly-away maint • Fly-away augment for RAV/ PMAVs and reqd CM repairs • Tools and test equipment	• No maintenance techs at MMSA • Minimal support for PM, use Fly-away for PMAV and RAV • Key tools and test equipment
Supply	• COSBAL for local maint support plus PMAV/RAV • Insurance spares support PMAV/RAV • Local consumables	• COSBAL to support PMAV/RAV • Insurance spares to support PMAV/RAV • Local consumables	• COSBAL to support PMAV/RAV • Insurance spares to support PMAV/RAV • Local consumables
Mission Package Exchange	•Fly-away team performs MP Exchange (size of the team to be determined by the Hull and Mission Package) •MMRC coordinates local requirements, shipping, receiving, may assist	•Fly-away team performs MP Exchange (size of the team to be determined by the Hull and Mission Package) •MMSA coordinates local requirements, shipping, receiving	•Fly-away team performs MP Exchange (size of the team to be determined by the Hull and Mission Package) •MMSA coordinates local requirements, shipping, receiving

Table 2-2: Notional FOS mission module sustainment options in Wargame I

2.1 FOS Salmon / Robust

Figure 2-2: Notional FOS Salmon Location

Overview. Forward Operating Station (FOS) Salmon is located on a nomtional island geographically coincident with Japan and contains a large facility already in use by the U.S. Navy with extensive existing infrastructure. It is the most robust of the three forward operating stations, containing a Mission Module Readiness Center (MMRC) with two full maintenance teams, capable of Facilities Maintenance (FM), Corrective Maintenance (CM), and Preventive Maintenance (PM), although a fly away team is still required for some CM and RAV's/PMAV's. COSAL exists in a warehouse with OEM reachback capability. There is a large airport 32 miles away and roads and commercial trucking are adequate.

Facility	Description
Sustainment Model	Robust
Piers	Support for 4 LCSs in nested pairs. Two LCS berths available assuming HP USN Ships are in-port
Seaframe Maintenance Facility	20 person CTR Planning office /140 Person CTR TDY team/17 Person LCSRON Planning office 114kf^2 of existing ship maintenance support space Admin office via Temporary facility(e.g. Leased Trailers) Drydock Capability
MP maintenance Facility	MMRC 20kf^2 adjacent to SF Maintenance Facility 16 person MMRC(1 - Government + 15- CTR TDY Team) CTR Team - 1 Manager, 1 Logistician, 13 maintenance techs
AV Maintenance Facility	Helipad at nearby USN complex. Maintenance hangar available local
Transportation	Large Airport 32 miles away Adequate roads and commercial trucking
Warehousing	Sufficient warehousing capacity to support mission
Support Services	Container Handling, Crane services, Shore Power, all general hotel services
Ordnance Handling/storage	Full service ordnance loading and storage, large new storage capacity
FOS Housing	On-Base housing is limited
Commercial Housing	Off-Base housing is available but considered less desirable
Local Labor Force	Large – Restricted to non-NOFORN work only
Cold Storage	10kf^3 cold storage on base, exchange, commissary, MSC etc.

Table 2-3: Notional FOS Salmon Sustainment Model

Logistics. Although FOS Salmon is the most robust of the three forward operating stations, it is located more than 1400 NM away from four out of five operating areas. There is limited on-base housing for crew rotations. Off-base housing is available, but less desirable. There is sufficient warehouse capacity to support the mission, as well as container handling, crane services, shore power, and all general hotel services. In addition, FOS Salmon contains a new large storage capacity for ordnance, including full service loading.

AT/FP Implications. As the most robust FOS, Salmon had the most assets for elevated Force Protection Conditions (FPCONs). The teams used the organic personnel capability of the FOS to augment the crew during FPCON CHARLIE. With these augmentations, regularly scheduled PMAV maintenance was still able to be performed during the elevated FPCON. In other forward operating stations, this was not the case. FPCON watches took the place of maintenance, which had to be postponed until the FPCON was lowered. It was determined that FOS Salmon was the best place for an LCS to be berthed if an elevated FPCON occurred.

Maintenance. The teams found maintenance to be especially convenient at FOS Salmon. There was robust supply support and pier space capable of performing two simultaneous PMAV's. With a large warehouse capability, repair parts were on-hand and ready for installation. A skilled labor force was on site to handle maintenance and routine repairs and transportation for personnel and cargo was readily available. With this large maintenance footprint, Salmon provided the most flexibility with ship schedules.

On the other hand, the robust maintenance support did not account for catastrophic events, such as a major engine failure. The transit distance to the AOR was extensive and catastrophic equipment failure was not likely to be a rare occurrence. In addition, there was limited access to HN labor capable of performing NOFORN work. The maintenance teams were primarily comprised of U.S. contractor personnel. If HN labor was needed, it was a security concern since there was no long-term solution to security escort requirements. The short-term solution was to use ship's force personnel to perform security escort duties.

Although the robust maintenance capability was a great advantage, it also is a burden to maintain. There is a large overhead cost for maintenance personnel kept on station during dormant maintenance periods or when only one team is needed. In addition, there is potential for repair parts and consumables to sit in the FOS without demand. There is a cost associated with inventory management, forward staging, and asset visibility.

In order to mitigate the cost, one team proposed rebalancing the seaframe maintenance team and allocation of resources. They suggested increasing TDY for corrective and preventative maintenance and using the local HN labor force for facilities maintenance. In addition, the recommendation was made to use PCS as opposed to TDY for CM and PM. This would result in more retained corporate knowledge. Personnel would be on station for longer periods of time vice coming in for a shorter TDY period, greatly reducing knowledge lost due to turnover.

Mission Module (MM) Swaps. Salmon was the ideal FOS for mission module swaps. It has enough pier space, storage capacity, support services, and maintenance teams to complete two simultaneous MM swaps. The airport 32 miles away is convenient for transporting equipment and personnel and the

roads are adequate. A flyway team conducts the actual MM swap and the MMRC coordinates any local requirements, such as shipping and receiving.

Aviation. FOS Salmon was also the ideal FOS for aviation maintenance. There is a helipad at a nearby USN complex and a local hangar available. An AVDET is on station with support from flyaway teams.

2.2 FOS Green / Moderate

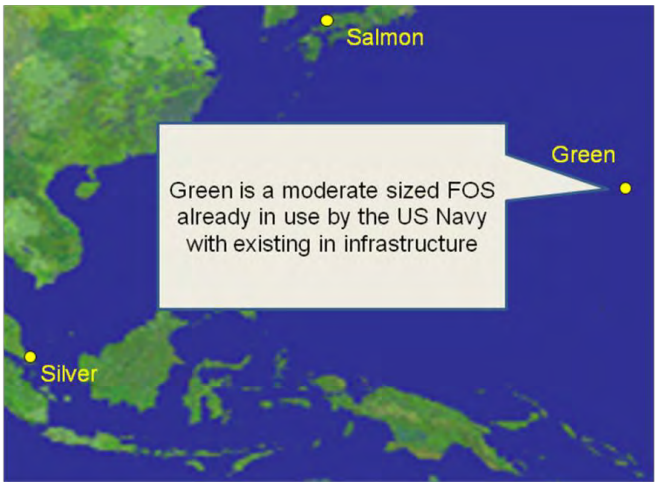

Figure 2-3: Notional FOS Green Location

Overview: Forward Operation Station Green is a notional site where the location coincides with that of Guam but the capability is not completely representative of Guam. The FOS has a moderate sustainment approach that falls somewhere in between that for the more austere FOS Silver and that for the more robust FOS Salmon. The FOS has a 20 person CTR planning office, a 60 person temporary duty (TDY) CTR team, a 17 person LCSRON Planning Office, 20,147 ft2 Mission Module Staging Annex (MMSA) for module swap outs and pier space for four LCSs in nested pairs. FOS Green has crane services and container handling capabilities but shore power requires temporary equipment to augment it. There is a large airport only 10 miles away and adequate roads for commercial trucking. There is sufficient warehousing capacity but it is combined with dry stores storage for the Combat Logistics Force (CLF). The FOSs on-base housing capability is the best among the sites under consideration. However, off-base housing is limited and largely substandard.

Facility	Description
Sustainment Model	Moderate
Piers	Support for 4 LCSs in nested pairs in USN-Controlled port
Seaframe Maintenance Facility	20 person CTR Planning office /60 Person CTR TDY team 17 Person LCSRON Planning office Located near LCS Berthing location using several existing permanent spaces Admin office via Temporary facility(e.g. Leased Trailers)
MP maintenance Facility	MMSA 20kf^2 near SF Maintenance Facility 9 person MMRC(1 - Government + 8- CTR TDY Team) CTR Team - 1 Manager, 1 Logistician, 6 maintenance techs
AV Maintenance Facility	Available at tenant USN Rotary squadron facility at U.S. Base 25miles away
Transportation	Large Airport 10 miles away Adequate roads and commercial trucking
Warehousing	Sufficient warehousing capacity but combined with dry stores storage for CLF
Support Services	Container Handling, Crane services, Shore Power requires temporary equipment to augument
Ordnance Handling/storage	Large new USN controlled storage facility. Full service T-AKE capable ordnance loading berth
FOS Housing	On-Base housing is sufficient
Commercial Housing	Off-Base housing is limited and largely substandard
Local Labor Force	Moderate – skilled in admin/service industry, limited industrial/technical
Cold Storage	560f^3 cold storage on base for exchange, commissary and CLF

Table 2-4: Notional FOS Green Sustainment Model

Logistics. As a U.S. controlled port the FOS has the benefits of good infrastructure and the lack of a need for DIP clearances. DIP clearances have been identified as a non-negligible issue for other FOSs under consideration.

There are potential logistics issues associated with FOS Green's distance to potential OPAREAs. The long transit time puts increased pressure on the crew to meet their Mission Ready for Tasking (MRT) requirements. This is particularly true for unexpected required maintenance or emergent tasking.

There is a large USN controlled storage facility that is authorized for ordnance handling. The facility also has a T-AKE loading berth. The FOS does not have the permanent capability for ordnance allocation for the different LCS MPs. There is however limited capacity for cold storage.

AT/FP implications. LCS does not possess an organic ATFP capability for heightened security levels, especially for that beyond FPCON Bravo. Despite a non-negligible US presence at FOS Green there still is no capability to provide immediate security above FPCON Bravo. The ship is forced to leave the port and coordinate with local contractors and LCSRON to meet the security requirements. The ship is then limited to maintenance tasks that can be completed underway.

Maintenance. FOS Green has one full (80FTE) maintenance team for preventative, corrective, and facilities maintenance. The maintenance team is augmented by Fly-away support and a 60 person temporary duty (TDY) contractor team. There is also access to a local labor force that is skilled in administrative or service industry type tasks but has limited industrial/technical skill sets.

The FOS has a minor enhanced COSAL and portable spare kits with a limited inventory. As with the other FOSs under consideration there is OEM reachback support. Despite having a full maintenance team, FOS Green will have insufficient maintenance personnel to handle multiple maintenance tasks concurrently. While the base does have some capability in this area it has half the personnel of FOS Salmon (2 full fwd teams, 160FTE).

Mission Module. FOS Green has a mission module team of 9 personnel (1 Govt, 8 Contr), 6 of which are maintenance techs located at the Mission Module Staging Anenx (MMSA). A big advantage FOS Green has over its less robust counterpart (FOS Silver) is the ability to perform local PM/CM on the mission module. The maintenance team is only half the size of the one positioned at FOS Salmon but it is potentially adequate for mission module resupply and retrograde. Again, for manpower intensive events such as multiple MP swaps the support available will not be adequate.

Similar to the other FOSs under consideration, FOS Green relies on Fly-Away teams to bring Mission Package equipment into theater. Even under the best of conditions it is projected that getting this equipment into theater will take 3 C-5s or 5 C-17s and at least 21 days. The proximity of the FOS to the airport, the good local infrastructure, and the quality commercial trucking routes make the transportation of the Mission Module equipment from the airport to the pier a relatively straight forward task. The 20,147 ft^2 MMSA does give the FOS some capability to store Mission Package related equipment.

Aviation. FOS Green has an aviation maintenance facility available at a tenant USN Rotary squadron facility located on a US base that is approximately 25 miles from the FOS.

Helos are not forward stored and therefore the helo and the AVDET will need to be taken from another squadron or COCOM. Swapping out an MH-60 helo would require additional strategic airlift and possible re-assembly of the aircraft at the APOD depending on which aircraft (C5 or C17) is used. Outside of steady state operations competition for these assets is expected.

2.3 FOS Silver / Austere

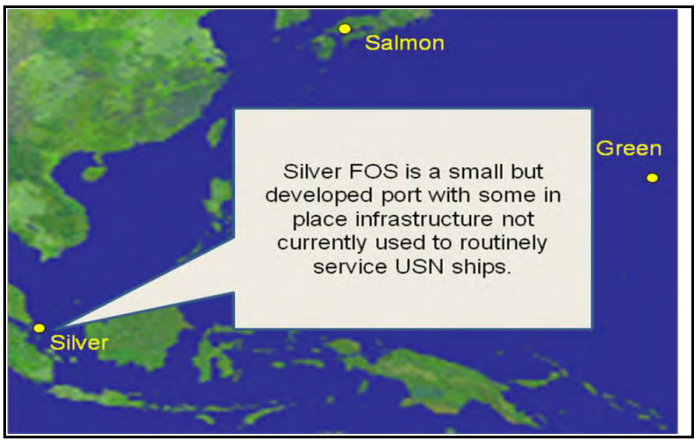

Figure 2-4: Notional FOS Silver Location

Overview. Forward Operating Station (FOS) Silver is a small but developed port with some in-place infrastructure which is not currently used to service U.S. Navy ships, and access to a moderately skilled HN labor force. FOS Silver is the most austere of the three FOS's, containing a 20 person CTR planning office, a 17 person LCSRON Planning Office, a 20,000ft MMSA for module swap outs and pier space for four LCSs which must be scheduled via a local USN representative . FOS Silver has crane services, container handling capability and full hotel services. There is a large international airport 2 miles away with a HN airbase and C-17 capability adjacent to HS naval base; adequate roads and commercial trucking are available. Available local warehousing is 20 miles distant at the US Navy tenant base and cold storage is very limited. There is no permanent ordnance handling/storage facility, only access to temporary HN facilities. FOS Silver has very limited on-base housing and high cost off-base housing. Due to its austere environment, all evolutions at FOS Silver require more advanced planning and coordination compared to more robust sites.

Facility	Description
Sustainment Model	Austere
Piers	Support for 4 LCSs available at host nation naval base. Berths are not "on-demand" and must be scheduled via USN local representative
Seaframe Maintenance Facility	20 person CTR Planning office , 17 Person LCSRON Planning office Temporary facility at HN naval base - Repairs conducted by local contractors will be done at USN Tenant base ~20miles away from LCS Berth locations
MP maintenance Facility	MMSA 20kf^2 near SF Maintenance Facility 2 person MMRC(1 - Government + 1- CTR TDY Team)
AV Maintenance Facility	Helo maint capability at HN airbase 20 miles away-must be prearranged via USN local representative
Transportation	Large International Airport 2 miles away, HN air base with C-17 capability adjacent to HS navy base, Adequate roads and commercial trucking
Warehousing	No local warehousing but available at USN tenant base 20 miles away
Support Services	Container Handling, Crane services, Full hotel services
Ordnance Handling/storage	No Permanent Facility, Temporary facility exists at HN Base, must be arranged by USN rep
FOS Housing	Very limited on-base housing;space available
Commercial Housing	Off-Base housing is available but high cost and must be arranged by USN rep
Local Labor Force	Moderate – skilled
Cold Storage	Very limited - 200f^3 cold storage on US Tennant base 20 miles away

Table 2-5: Notional FOS Green Sustainment Model

Logistics. Despite its austere infrastructure and limited capacity, one of the primary positive aspects of FOS Silver was its closer proximity to four of the five OPAREAs/JOA supported by the LCSs during the game. This allowed for shorter transit times and more rapid movement of LCSs to and off station than the other, more distant, FOSs, and enabled LCSs operating from FOS Silver to respond quickly to emergent tasking.

While FOS Silver was assessed to have adequate infrastructure and pier capacity, pier space and pier support are not under U.S. control, are not always available on-demand and must be coordinated with HN. There is no available dry dock for LCS. Crane services and pier access are all under HN control.

FOS Silver also has a comparatively small permanent U.S. footprint which would allow U.S. personnel to blend more easily into HN infrastructure and avoid establishing a large and expensive U.S. presence with attendant Geo-political and potential ATFP issues. The smaller footprint also drove more focused Fly Away Teams (FATs) for support. The FOS was able to appropriately size these maintenance teams to specific requirements without excess manpower.

The limited number of personnel at FOS Silver requires the use of more HN labor than at the other two FOSs. However, these HN labor costs will likely be more affordable than U.S. labor if a waiver for Title 10 restrictions can be obtained. The anticipated use of HN labor requires that FOS Silver have a robust contracting capability on site. Foreign nationals will require the proper security and country clearances in order to provide support to LCS. Escorts will be required for HN or local support onboard the LCS. Local holidays, workdays, working hours, local cultural norms will need to be taken into account for HN labor scheduling. Once a contracted HN worker is trained he should not require re-training for the next job.

A main shortfall at FOS Silver is the lack of a permanent organic ordnance storage capability. FOS Silver has only access to ordnance storage at the HN base which requires advance comprehensive planning with HN with the understanding that any storage is both temporary and short-term. FOS Silver would likely need to request HN support for ordnance handling or request a Fly away ordnance team required to transport to and from the APOD to FOS Silver safely and maintain chain of custody control. Once ordnance is at the HN facility, FOS Silver or LCS personnel would need to be assigned to provide round the clock security. The FOS has no location available to move ordnance ashore, and might need to schedule a CLF to accomplish ordnance transfers. Early coordination with HN is required for movement and storage of ordnance and large systems like 30mm guns.

AT/FP implications. FOS Silver's austere manning and environment creates security issues for personnel, the facility and FOS operations when AT/FP levels are increased, especially when increased beyond FPCON Bravo. AT/FP up until FPCON Bravo is covered by HN contract and ship's force. The FOS is manned to provide for FPCONs up to Bravo but required LCSRON coordination with the embassy/consulate and HSP required to meet FPCON requirements. Higher security postures will negatively impact ongoing LCS maintenance schedules and would require personnel augmentation to continue planned maintenance. One team determined they could not set FPCON Bravo and do maintenance at the same time so ongoing maintenance was stopped and the LCS transitioned to preparations to get underway.

Maintenance. A significant concern with FOS Silver was the absence of permanent maintenance teams. Everything relies on 'all the dominoes falling in right order' to get maintenance teams and parts from CONUS to FOS Silver on time (diplomatic clearance, the right parts on time, the right ordnance at the right time). The FAT concept has a multitude of moving parts; if one doesn't fall the right way, the entire support chain is temporarily broken. This could impact LCS missions or MP swap-outs, with major impacts on LCS schedules. The teams did not believe that the FAT concept could support concurrent PMAVs.

Due to the minimal number of U.S. personnel forward at FOS Silver, all LCS maintenance work for PMAVs and RAVs at the FOS is reliant on FATs. This constraint, coupled with the lack of on-base housing creates a high cost issue for FOS Silver. Off base berthing near the FOS is expensive (estimated by one team at $500 per person per day) for FATs, crews conducting turnovers and MM swap-out teams. Enhanced COSAL repair parts on site do not eliminate fly-away support requirement (wrench turners) and there are also OPTEMPO/costs for FATs. This FOS is so reliant on contract labor, it requires that all scheduled maintenance is fully funded in the budget.

The limited repair capability at FOS Silver requires FATs, even for limited emergent repairs. There is some risk to depending so heavily on FATs due to the potential for schedule conflicts; loss equipment and/or parts; delay of either the parts or the FAT required for a PMAV/RAV which would introduce delays and impact the overall maintenance schedule. This could have a big impact on the ships force while awaiting the FAT, possibly pushing more maintenance onto the ships force as people or parts are delayed en route. Emergent corrective and/or additional maintenance/repair requirements will increase lead times required for coordination and delay repairs, especially any requirements for specialized skills such as divers.

Robust pre-planning is required for this type of forward support concept at an austere FOS. There is a higher level of detailed advance planning require to ensure effective use of LCS FATs at this FOS. Teams felt there would need to be extensive coordination with the LST to get necessary services since no husbanding agent representative on site.

Other considerations for FAT repairs are HN customs requirements, the availability of limited strategic airlift capacity for repair parts and equipment, regulations and coordination for the movement of Hazmat into the HN. Coordinating customs, diplomatic, and HAZMAT clearance lead times could be difficult given the volume of personnel, parts and equipment required to flow through the APOD at an austere FOS.

The FOS lacks local warehousing on the FOS which is only available at the USN tenant base 20 miles away. FOS Silver warehouse and staging limitations may be compounded/impacted by any transportation delays.

Mission Module. It's not clear what type of support is needed on the ground or available from the HN to do more than one MP swap out at the same time. Additionally, requirement for pier space, berthing has to de-conflicted with the economic interests of the HN. It is unknown if FOS Silver can tie up the HN pier space required to do two simultaneous MP swaps.

FOS Silver was determined by the teams to be partially adequate for a multiple LCS MM swap-out. This shortfall might be addressed by establishing an organic capability to support MM swap-out the austere FOS, possibly a HN agreement to stage MM packages locally or by only conducting swap-outs at a more robust FOS.

Aviation. The international airport near FOS Silver is also under HN control and impact on ramp space at the airport would be substantial during MM swap-outs. For multiple MM swap-out, the team made the

assumption FOS Silver can do both swap-outs concurrently. That would require 3 C-5s or 5 C-17s which is a large amount of aircraft landing at same time in the HN airport. Swapping out an MH-60 helo would require additional strategic airlift and possible re-assembly of the aircraft at the APOD depending on which aircraft (C5 or C17) is used. The helo would require a team to re-assemble it and perform a FCF before it could be flown to the FOS.

Weaknesses of FOS Silver/Austere Option

- Pierspace/berths not available on-demand/Pierspace deconfliction.
- No drydock
- Berthing issues: high cost off-base only (fly-away, ship's crew), i.e., $500 per day/person
- Emergent diving services/equipment lead-time
- Ordnance handling including all MHE requires advanced/comprehensive planning with host-nation and storage is temporary and short-term.
- AT/FP up until FPCON B is covered by HN contract and ship's force.
- Critical capacity of manpower.
- HN or local support for maintenance is desirable up to Title 10 limitations, possibly relief from Title 10 limitations for FM and PM.
- Escorts required for HN or local support onboard.
- Local holidays, workdays, working hours, local cultural norms
- Customs, diplomatic, HAZMAT clearance lead times
- All evolutions require more advanced planning compared to more robust sites
- Emergent corrective and/or additional maintenance requirements will increase lead times and delay repairs
- Need to capture repair part demands purchased w/ credit card
- Enhanced COSAL repair parts do not eliminate fly-away support requirement (wrench turners)
- OPTEMPO/costs for fly-away teams
- I level support for aviation assets same support considerations as shipboard
- Warehouse and staging limitations which may be compounded/impacted by transportation delays

2.4 Real-World FOS MILCON Issues

During the wargame it was assumed that the different FOS alternatives had the infrastructure to support LCS. However, MILCON for potential real-world FOS sites has not been budgeted to support LCS operations in 2016. Infrastructure requirements need to be provided to the host nation so they can be properly budgeted and meet the construction deadline for 2016.

More analysis is required to determine required level of new installation support in real-world to support the various sustainment options.

Recommendation: Determine MILCON requirements for FOS NLT June 2012 to inform host nation budgeting requirements.

2.5 Mission Ready for Tasking

Mission Ready for Tasking (MRT) is a metric developed for the wargame to measure the percent of time a ship is ready for a mission assignment. The metric was developed using the LCS Wholeness CONOPS as a reference. It is important to keep in mind that MRT is not the same as operational availability (Ao), a metric with which the Navy is very familiar. Determination of whether an LCS is MRT is a two part assessment of first material availability and then operational availability. Material availability requires all mission critical equipment to be functional and the system to have a sufficient level of predicted reliability. To be deemed operationally available LCS must be outside of administrative tasking such as: WOWU, MP SWAP, MPWU, Crew Swap, and Turnover as well as have the correct MP configured for the desired mission. The platform is considered unavailable if the ship is in a RAV or if a crew member with critical skills is considered unavailable (ex: unplanned loss). A visual display of the MRT formula can be seen below:

Material Avail	Definition
Reliability Sufficient	Predicted Reliability of a system is sufficient to remain available for the duration of a mission(i.e.25 days)
Material is Operational	Current state of the equipment required for a mission is up/available

+

Operational Avail	Definition
Not-WOWU MP SWAP MPWU Crew Swap Turnover	During these evolutions the ship is considered unavailable
Correct MP	Ship must be configured with the correct MP to be ready for a tasking
Not-Equipment Disabled	Ship is unavailable if required equipment has been removed from service to perform maintenance
Not in CMAV	During CMAV the ship is considered unavailable
No UPL	Crew loss of a critical skills is considered unavailable

= MRT

Figure 2-5: Mission Ready for Tasking (MRT) Formula

In the meetings leading up to Wargame I there was a lot of discussion relating to the MRT metric. There is general agreement that a metric is needed to measure the expected availability of LCS but there is a lot of disagreement on which details should compose the definition. When a consensus is made on the definition it needs to be widely publicized to ensure its usefulness and to avoid confusion with common metrics like Ao.

3. LCS Wargame Participant Demographic Survey Results

LCS Wargame participants were asked to provide responses to a demographic survey targeted at gaining insight into their military background as well as their past and current LCS experience. The survey captured data on each participant's service branch, pay grade, functional area, and tenure in their current position. The questions regarding LCS experience ranged from broad topics such as manning, training, and the seaframe to specifics regarding the Mission Packages and logistical issues associated with CONUS and OCONUS operations. Between the three LCS Wargame teams, the answer cell and the

executive panel there were approximately 66 participants with 62 responses to the survey (94%). There were another 16 responses from a cell of 18 observers monitoring the gameplay for the week, for a total of 78 responses out of 84 potential respondents (93% response rate).

Participant Background. 57 of the 78 (73%) survey respondents identified their service branch as the U.S. Navy. Over half of the participants had a rank of either lieutenant commander or commander. The most represented functional areas at the wargame were logistics (49%) and requirements (22%).

A majority of the participants had less than two years in their current position at their command or organization. A significant number of participants (18%) had over four years of experience.

Participant LCS Experience. The LCS experience questions were designed to measure the baseline level of familiarity with LCS topics among the wargame participants. Participants were asked to judge their level of familiarity with various LCS issues using a multiple choice scale that transitioned from "Not Familiar" to "Expert". The topics that received the highest scores were the 3:2:1 deployment concept, seaframe training and hardware systems, and LCS sustainment both within and outside CONUS. The lowest scores were observed for questions relating to the Missions Packages. This included the capabilities and limitations of each of the three MPs along with the associated maintenance and training. For these questions most participants indicated that they were minimally familiar with the topic. This gap in knowledge is at least partially attributable to the mission packages still being in the early stages of development.

Separate questions were asked to glean each participant's level of specific experience with LCS. These questions targeted not just familiarity with a topic but the level to which LCS is part of the subject's job. In general there were a large proportion of participants that designated having no LCS specific experience. The highest percentage of "No LCS specific experience" responses was given on the topics of LCS acquisition (61%) and LCS seaframe operations (51%). These high percentages show that most of the participants do not deal with LCS issues as a daily part of their job and may therefore be expected to respond to wargame scenarios independent of having any direct stake in the LCS program.

Participant List.

Table 3-1 contains a list of the Wargame I participants to include: players, the executive panel, the answer cell, modeling and simulation and observers. For each participant their Rank and command affiliation are provided.

Team	Last Name	First Name	Rank	Command
Answer Cell A	Buckley	James "Chip"	Mr.	PEO LCS/PMS-505
Answer Cell A	Catlow	Darren	LT	AT/FP
Answer Cell A	Copeland	Alan	LCDR	CNAP/CNAF N80
Answer Cell A	Cording	Bill	Mr.	NAVSUP GLS
Answer Cell A	Hodges	Cody	CDR	CTF-73 N41B
Answer Cell A	Johnson	Jimmy	Mr.	Lockheed Martin
Answer Cell A	Luna	Alvaro "A.J."	LCDR	FLC San Diego LST
Answer Cell A	McFadden	Pat	Ms.	USFF N464A
Answer Cell A	Mills	Joe	Mr.	Lockheed Martin
Answer Cell A	Vermillion	Spencer	Mr.	NAVSUP LOC
Answer Cell A Lead	Winter	Kurt	CAPT	NRU CO
Answer Cell B	Armstrong	Tom	Mr.	USFF N41
Answer Cell B	Cullum	Earl	LCDR	FIT N41 AMO/ILS Officer
Answer Cell B	Darwin	Mark	Mr.	SURFMEPP
Answer Cell B	Davis	C.R.	Mr.	General Dynamics - Bath Iron Works
Answer Cell B	Glosby	Les	CDR	CLWP N43
Answer Cell B	McNeeley	Don	Mr.	NAVSUP LOC
Answer Cell B	Poland	Aaron	LT	LCSRON-1 Manpower
Answer Cell B	Rosequist	Ed	Mr.	NAVCYBERFOR N86
Answer Cell B	Spangler	Greg	CDR	OIC NMC CED
Answer Cell B	Volpe	John	LCDR	USFF ATFP N3
Answer Cell B Lead	Weekes	Godfrey "Gus"	CDR	PEO LCS/PMS-505
Answer Cell RFI	Garner	Randy	CDR	CNSP N8B
Executive Panel	Anderson	Greg	CAPT	USFF N86
Executive Panel	Harrison	Frank	CAPT	Aviation SOPA
Executive Panel	McMechan	Zach	CDR	CPF N831
Executive Panel	Payor	Andrew	Mr.	PEO-LCS
Executive Panel	Randall	Rob	CAPT	LCSRON-1 N00
Executive Panel	Uhl	John	CAPT	OPNAV N86E
Executive Panel	Yohe	Jim	CAPT	CNSF N8
Mod & Sim Team	Better	Manuela	Ms.	DEI
Mod & Sim Team	Blackman	Andy	Mr.	General Dynamics - Bath Iron Works
Mod & Sim Team	Bork	Don	Mr.	Lockheed Martin
Mod & Sim Team	Bunea	Cornel	Mr.	DEI
Mod & Sim Team	Dundics	Marton	Mr.	DEI
Mod & Sim Team	Flannigan	Anne	Ms.	Lockheed Martin
Mod & Sim Team	Miller	Heather	Ms.	Lockheed Martin
Mod & Sim Team	Pearsaul	Brian	Mr.	Lockheed Martin
Observer	Birchler	Don	Mr.	CNSF CNA Rep

Observer	Cheshure	Kevin	CDR	OPNAV N41
Observer	Clifton	Vince	CAPT	NAVSUP GLS, Code 30
Observer	Fitzgerald	Chris "Pyro"	Mr.	CNAP/CNAF N80
Observer	Gilbert	Dave	Mr.	SWDG TD
Observer	Harrill	Thomas "Brock"	Mr.	COTF
Observer	Jonson	Bill	Mr.	USFF N74
Observer	Kaylor	Paul	LCDR	USFF N/5/8/9
Observer	King	Trevor	CDR	OPNAV N86
Observer	Lommel	Paul	Mr.	LCSRON-1 N43
Observer	McNealy	Matt	LCDR	OPNAV N431
Observer	Nygard	Lewis "Chris"	Mr.	PEO LCS/PMS-505
Observer	Personius	Bill	Mr.	LCSRON-1 Consultant
Observer	Polk	Chris	LCDR	CSG10
Observer	Rios	Mark	CAPT	OPNAV N852
Observer	Sposato	William Thomas	Mr.	PMS 505
Observer	Stewart	Jim	Mr.	CNSF N8B1
Team 1	Carlson	Arrvid	LCDR	CPF N835
Team 1	Dexter	Mark	Mr.	CPF N41B
Team 1	Dietrich	Glenn	CDR	C6F
Team 1	Fonte	Vince	LCDR	NAVSUP LOC
Team 1	Fults	Mary Alice	Ms.	COMNAVSURFLANT N85
Team 1	Han	Wes	LTJG	FLC San Diego LST
Team 1	Jackson	Ray	LCDR	CHSMWP
Team 1	McCarthy	Will	Mr.	PAPM MP&T
Team 1	Salinas	Angel	CDR	LCSRON-1 N43
Team 1	Simaytis	Fred	LCDR	CNSP N43
Team 1	Wells	Matt	CDR	CHSMWP
Team 1 Lead	Thien	Patrick	CDR	FREEDOM XO
Team 2	Brown	Myron	LCDR	C4F
Team 2	Escoto	Romy	Mr.	FLC San Diego LST
Team 2	Jerbi	Matthew	CDR	INDEPENDENCE CO
Team 2	Lawton	Frank	Mr.	PEO LCS/PMS-505
Team 2	Lucero	Juan	LT	CHSCWP
Team 2	Neeley	Chris	Mr.	CHSMWL
Team 2	Orellano	Ramiro	LCDR	CNSP N43
Team 2	Pressler	Chris	LCDR	CNSL N41
Team 2	Suganuma	Francis	Mr.	CPF N01CE
Team 2	Taylor	Jeremy	LT	USFF N41

Team 2	Wilson	Ricardo	CDR	MSC N41
Team 2 Lead	Hooks	Todd	CAPT	CNSP N43
Team 3	Aurelio	Carnell	LT	NAVSUP LOC
Team 3	Breeden	Bryan	LCDR	CPF N836
Team 3	Bronson	Bob	Mr.	CNSP N41
Team 3	Brown	Jeff	CDR	
Team 3	Cavins	Ed	LCDR	CNC/C5F Log Planner
Team 3	Edwards	James	CDR	FREEDOM CO
Team 3	Havlik	Cameron	LCDR	C3F
Team 3	Heise	Robert	LCDR	CNSL N4
Team 3	Lagerquist	Scott	CWO3	
Team 3	Ludwig	Wally	LCDR	CNIC HQ N54
Team 3	Santos	Danny	LSC	FLC San Diego LST
Team 3 Lead	Meyer	Jacqueline	CDR	CHSMWP

Table 3.1: Wargame I Participant List